

What is claimed is:

1 An optical polarization beam splitter comprising:  
 splitter/combiner optical elements aligned along a substantially straight-line  
 optical path;  
 5 a first input/output fiber terminating in a first ferrule aligned along a first  
 end of said optical path;  
 second and third input/output fibers terminating in a second ferrule aligned  
 along a second end of said optical path.

10 2 An optical polarization beam splitter comprising:  
 a first optical fiber having an end defining a first optical axis;  
 a second optical fiber having an end defining a second optical axis;  
 a third optical fiber having an end defining a third optical axis parallel to  
 and spaced apart from said second optical axis;  
 15 a collimating lens disposed along said first optical axis positioned to form a  
 collimated optical beam from said first optical fiber;  
 a focussing lens disposed along a path of said collimated optical beam;

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5 a birefringent walk-off crystal having a first face adjacent to said focussing lens and a second face located at a focal plane of said focussing lens and in contact with said ends of said second and third optical fibers, said crystal oriented such that and having a thickness between said first and second faces selected such that a first component of said optical beam having a first polarization exiting said crystal at said second face enters said end of said second optical fiber along said second optical axis and a second component of said optical beam having a second polarization orthogonal to the polarization of said first polarization exiting said crystal at said second face enters said end of said third optical fiber along said third optical axis.

10 3. The optical polarization beam splitter of claim 2 wherein said second and third optical fibers are polarization maintaining fibers.

15 4. The optical polarization beam splitter of claim 2 wherein said second optical axis and said third optical axis are spaced apart by a distance of less than 2mm.

5. The optical polarization beam splitter of claim 2 disposed in a package having a length of less than about 50mm and a diameter of less than about 10mm.

6. The optical polarization beam splitter of claim 2 disposed in a package having a length of no more than about 20mm and a diameter of no more than about 5.5mm.

5 An optical polarizing beam splitter comprising:

a first optical fiber having an end defining a first optical axis;

a second optical fiber having an end defining a second optical axis;

a third optical fiber having an end defining a third optical axis parallel to and spaced apart from said second optical axis;

10 a collimating lens disposed along said first optical axis positioned to form a collimated optical beam from said first optical fiber;

a birefringent walk-off crystal disposed in a path of said collimated optical beam, said crystal oriented such that and having a thickness between first and second faces thereof selected such that a first component of said optical beam having a first polarization transits said crystal along a first path and a second component of said optical beam having a second polarization orthogonal to that of said first polarization transits said crystal along a second path disposed at a walkoff angle with respect to said first path

and said first and second paths exit said second face of said crystal as substantially parallel first and second paths;

a Wollaston prism disposed along said substantially parallel first and second paths and oriented such as to bend said substantially parallel first and second paths towards each other to form converging first and second paths;

a focussing lens disposed along said converging first and second paths and positioned such that a first component optical beam travelling along said first converging path is directed into said end of said second optical fiber along said second optical axis and a second component optical beam travelling along said second converging path is directed into said end of said third optical fiber along said third optical axis.

8. The optical polarization beam splitter of claim 7 wherein said second and third optical fibers are polarization maintaining fibers.

9. The optical polarization beam splitter of claim 7 wherein said second optical axis and said third optical axis are spaced apart by a distance of less than 2mm.

10. The optical polarization beam splitter of claim 7 disposed in a package having a length of less than about 50mm and a diameter of less than about 10mm.

11. The optical polarization beam splitter of claim 7 disposed in a package having a length of about 36mm and a diameter of about 5.5mm.

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An optical polarizing beam splitter comprising:

a first optical fiber having an end defining a first optical axis;

a second optical fiber having an end defining a second optical axis;

a third optical fiber having an end defining a third optical axis parallel to and spaced apart from said second optical axis;

a collimating lens disposed along said first optical axis positioned to form a collimated optical beam from said first optical fiber;

a first Wollaston prism disposed in a path of said collimated optical beam

and oriented such that a first component of said optical beam having a first polarization transits said prism along a first path disposed at a first angle with respect to said first optical axis and a second component of said optical beam having a second polarization orthogonal to that of said first polarization transits said prism along a second path

disposed at a second angle with respect to said first optical axis, said first and second angles being substantially symmetrical about said first optical axis;

a second Wollaston prism disposed along said first and second paths and oriented such as to bend said first and second paths towards each other to form

5 converging first and second paths;

a focussing lens disposed along said converging first and second paths and positioned such that a first component optical beam travelling along said first converging path is directed into said end of said second optical fiber along said second optical axis and a second component optical beam travelling along said second converging path is  
10 directed into said end of said third optical fiber along said third optical axis.

13. The optical polarization beam splitter of claim 12 wherein said second and third optical fibers are polarization maintaining fibers.

15 14. The optical polarization beam splitter of claim 12 wherein said second optical axis and said third optical axis are spaced apart by a distance of less than about 125 microns.

15. The optical polarization beam splitter of claim 12 disposed in a package having a length of less than about 50mm and a diameter of less than about 10mm.

16. The optical polarization beam splitter of claim 12 disposed in a package having a length of no larger than about 30mm and a diameter of no larger than about 5.5mm.

17. An optical polarizing beam splitter comprising:

- a first optical fiber having an end defining a first optical axis;
- a second optical fiber having an end defining a second optical axis;
- a third optical fiber having an end defining a third optical axis parallel to and spaced apart from said second optical axis, said second and third optical axes being symmetrical about said first optical axis;
- a first focussing lens disposed along said first optical axis;
- a Wollaston prism disposed at a location along said first optical axis where a focal point of said first focussing lens lies on an interface between two component pieces of said prism such that a first component of an optical beam from said first optical fiber having a first polarization is directed along a first path disposed at a first angle with

respect to said first optical axis and a second component of said optical beam having a second polarization orthogonal to that of said first polarization is directed along a second path disposed at a second angle with respect to said first optical axis, said first and second angles being substantially symmetrical about said first optical axis;

5 a second focussing lens disposed along said first and second paths at a location selected to focus a first component optical beam into said end of said second optical fiber to focus a second component optical beam into said end of said third optical fiber.

10 18. The optical polarization beam splitter of claim 17 wherein said second and third optical fibers are polarization maintaining fibers.

15 19. The optical polarization beam splitter of claim 17 wherein said second optical axis and said third optical axis are spaced apart by a distance of less than 2mm.

20. The optical polarization beam splitter of claim 17 disposed in a package having a length of less than about 50mm and a diameter of less than about 10mm.



21. The optical polarization beam splitter of claim 17 disposed in a package having a length of no larger than about 30mm and a diameter of no larger than about 5.5mm.

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